

River Mile 10.9 Removal Action – Steep Sloped Areas

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Summary

This technical memorandum presents a revised remediation design for RM 10.9 where steep armored slopes prevent the removal of 2 feet of sediment both on the steep slopes and at the toe of the slopes. Revised design expectations were developed for dredging and capping in these areas (i.e., Station 29+50 through 37+60).

Dredge Design on Steep Slopes

As a result of the presence of high sub-grade that prevents dredging 2 feet of sediment in Cuts 4T and 6T, a field investigation was conducted by Great Lakes Dredge and Dock (GLDD) on September 13, 2013 to determine whether conditions in Cut 10 which makes up the “finger portion” of the Removal Area would prevent dredging 2 feet of sediment. The investigation consisted of probing on 10 foot spacing along both the river side and bank side of the Removal Area. A summary of the findings of this investigation are provided in Table 1 and photographs of the river bank are provided as Attachment #1.

Based on these findings it was determined that the majority of the Removal Area upriver of Station 29+50 will likely not be dredgeable because the steep slope is armored with rock. The rock armor appears to have been placed to prevent erosion of the steep shoreline and was found to extend from the shoreline to the toe of the slope. Significant soft sediment is not present along the armored slope and attempting to remove soft sediment from either the armored slope or at the toe of the slope could impact the integrity of the rock armor and destabilize the bank. The impacted area specific to Cut 10, with associated cross-sections, is provided as Attachment #2.

In order to prevent destabilizing the armored steep slope, it is recommended that the design be revised to eliminate dredging on the steep slope and that no dredging shall occur closer than 10 foot from the toe of the slope. The standard RM 10.9 cap will be placed from the toe of the slope to the edge of the navigation channel as well as areas that are not dredged and do not have a slope greater than 3H:1V (Station 29+50 to Station 30+50).

However, as several sediment cores were collected from the area, dredging will be attempted in several areas in an attempt to either remove soft sediment or demonstrate that the area cannot be effectively dredged. These test dredge areas will include at a minimum the locations of sediment cores 2012-A-0365, 2012-A-0366, 2012-A-0367, 2012-A-0368, 2012-A-0369 and 2012-CLRC-0481. The test dredging will consist of the following:

- Test dredging will be begin at the Navigational Channel boundary for each predetermined location and proceed towards the shoreline, stopping 10 feet from where the slope begins to rise up to the shoreline.
- The “dredgeability” of an area will be determined by the number of attempts that are made with the dredge bucket. If the initial attempt only brings up water no further attempts will be made. If the initial bucket is able to bring up a significant volume of sediment (i.e., >50% of bucket) another pass will be made. If the second pass brings up less sediment than the first pass no additional attempts will be made.

In addition, supplemental probing (as necessary) will be conducted to better define the extent of the rock armor and hard subsurface. Table 1 is a summary of the probing that was performed every 10 feet on September 13, 2013.

Table 1 – Summary of Field Investigation

River Side Station Location	Material Encountered	Bank Side Station Location	Material Encountered
29+60 to 30+50	Rock/Mud/Gravel	29+60 to 30+50	Rock/Boulders
30+60 to 31+50	*Mud/Gravel	30+60 to 31+50	Sand/Rock/Mud
31+70 to 31+90	*Mud/Gravel	31+70 to 31+90	Sand/Rock/Mud
31+60 to 32+50	Rock	31+60 to 32+50	Rock/Boulders
32+60 to 33+50	*Sand/Rock	32+60 to 33+50	Rock/Boulders
33+60 to 34+50	Rock	33+60 to 34+50	Rock/Boulders
34+60 to 35+50	*Sand/Rock	34+60 to 35+50	Rock/Boulders
35+60 to 37+60	Rock/Boulders	35+60 to 37+60	Rock/Boulders

*Where “Sand/Rock” is noted, a 3-5 inch layer of sand was found over rock or boulders. Where “Mud/Gravel” is noted, the material appeared to be similar to the hardpan material found in Cuts 4T and 6T with additional larger rocks.

Conclusions and Recommendation

A majority of the Removal Area upriver of Station 29+50 is currently assumed to be undredgable because of the presence of undredgable material (hard subsurface, rocks) and steep side slopes armored with rock. Environmental buckets are designed specifically to remove sediment and limit resuspension to the water column. However, this type of bucket is not designed to remove rock or hard subsurface types of material. As a result, a revised remediation design is recommended for RM 10.9. This revised approach consists of the following:

- Dredging and capping all areas within the Removal Area up to Station 29+50
- No dredging from Station 30+00 to Station 37+50 contingent on the findings of test dredging

- ☐ Capping will occur from Station 30+00 to 32+00 contingent on the results of the test dredging. Should the test dredging prove to be unsuccessful the existing sediment surface will be capped to the extent practical.
- ☐ No dredging or capping from Station 32+00 to Station 37+50 contingent on the result of the test dredging due to the presence of a steep rock armored slope.

A ten foot offset is typical for Sediment Removal Actions to prevent damaging armored (rip-rap) shoreline protection (i.e. Fox River OU1 and OU's 2-5 and Buffalo River).

Attachment #1



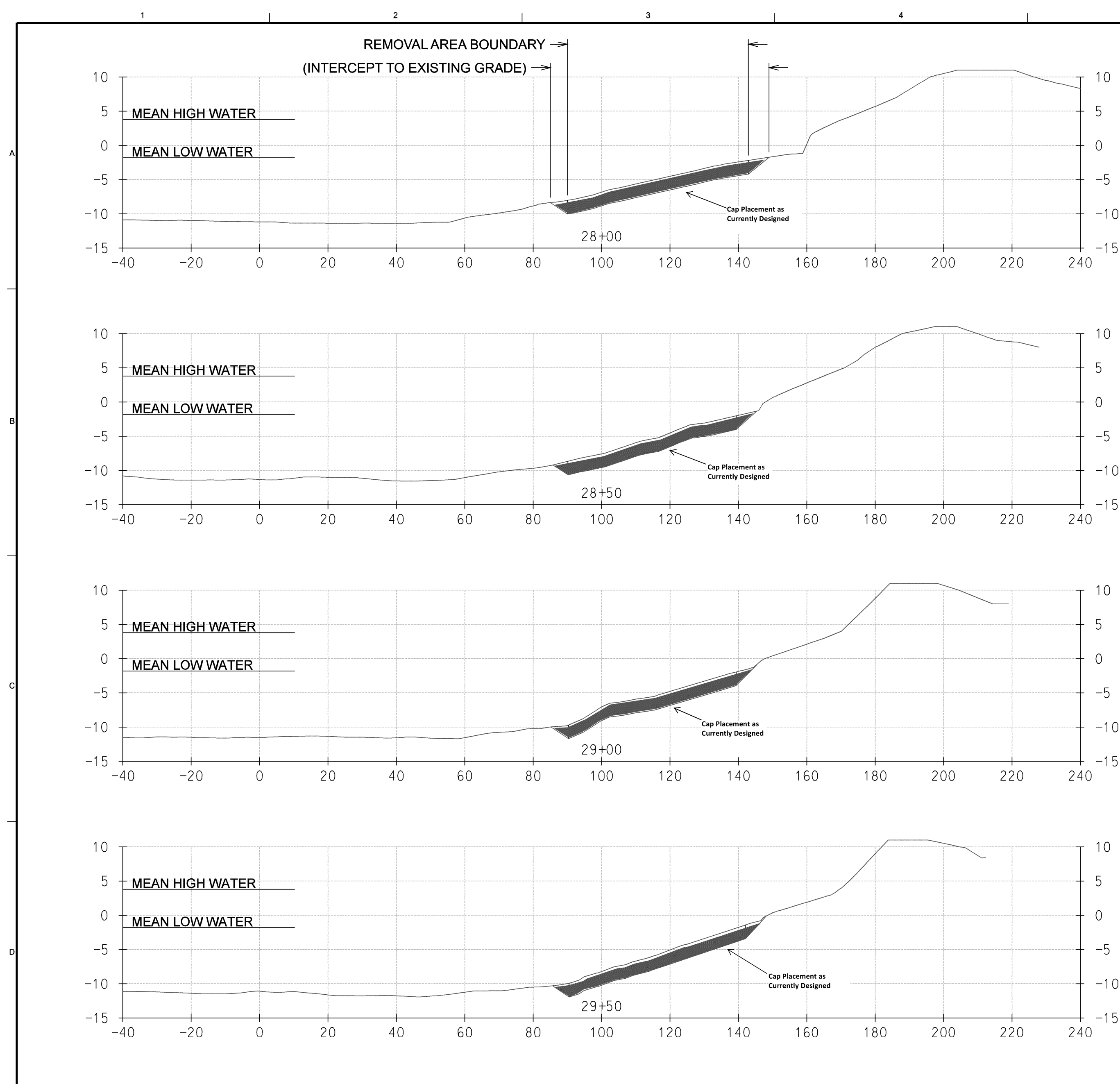


Approx Sta 31+00.



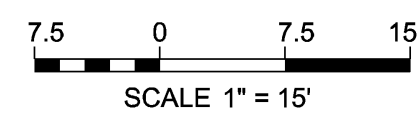
Where the water meets the rocks is the approximate edge of the cut.

Attachment #2



1. All elevations based on NGVD 29 Datum
2. Belleville Mean High Water: 3.786 Feet
Belleville Mean Low Water: -1.811 Feet
3. Final dredge elevations based on a average target elevation of minus 2 feet from existing sediment surface
4. See Drawing C-7 for location of cross sections

——— EXISTING SEDIMENT SURFACE
 ——— POST DREDGING ELEVATION
 ——— REMOVAL AREA BOUNDARY



CH2MHILL®		RM 10.9 TIE CRITICAL REMOVAL ACTION CIVIL			
		RM 10.9 Sediment Deposit and Removal Areas Lower Passaic River Study Area, New Jersey			
		DREDGING CROSS-SECTIONS (SHEET 10 OF 14)			
VERIFY SCALE		DATE 2 JULY 2013		DATE 2 JULY 2013	
BAR IS ONE INCH ON ORIGINAL DRAWING.		PRJ LOWER PASSAIC RIVER		DWG C-16	
SHEET		18		OF 21	

